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of species in certain localities, and the still more common introduction of plants of the Old World. There are many reasons why these changes should be carefully watched and duly recorded. Papers dealing with these matters, however, are chiefly of local interest, and lose much of their instructive power and significance if published in a journal remote from the field they cover. It is, doubtless, with a clear perception of these conditions that the New England Botanical Club proposes to issue a small but convenient medium for such communications regarding the flora of New England. The Club was founded in December, 1895, and now contains thirty-five resident members (those living within twenty-five miles of Boston), and as many non-resident members. Its annually elected presidents have been Prof. W. G. Farlow, Mr. N. T. Kidder, and Prof. G. L. Goodale. The herbarium of the Club is situated in the Botanical Museum at Cambridge, Mass. It has been of rapid growth, and is likely to become the most complete local collection of New England plants. The earnest and scholarly *personnel* of the New England Botanical Club is the best guarantee for the success of the proposed journal.

B. L. R.

Garden-Making.¹—While horticulture is an art rather than a science, its methods and results have such a manifold bearing upon plant life that a good work on gardening must always have a great interest for botanists. The 400-page octavo now at hand is neat, carefully planned, and copiously illustrated. It is true, in this age of handy manuals, these may not seem very exceptional qualities, but Professor Bailey's book has still more to recommend it. It comprises the result of much experience, is simple and practical in its suggestions, and, above all, is written in a style which is animated and really entertaining. Suggestive works on horticulture are not rare; that is, books which are either repositories of carefully stated facts or books which with less critical presentation of facts have a pleasing style, but a book which combines a wealth of accurate and practical information with a clear, vivacious, and at times even humorous style is truly exceptional.

To many people a garden is a source of more discouragement and vexation than of pleasure. To such persons Professor Bailey's charmingly facetious introduction must come as a cheering philosophy, renewing interest and inspiring courage. It runs: "Every family can

¹ By L. H. Bailey, aided by L. R. Taft, F. A. Waugh, and E. Walker. Published by the Macmillan Co., New York, 1898. \$1.00.

have a garden. If there is not a foot of land, there are porches or windows. Wherever there is sunlight, plants may be made to grow; and one plant in a tin can may be a more helpful and inspiring garden to some mind than a whole acre of lawn and flowers may be to another. The satisfaction of a garden does not depend upon the area, nor, happily, upon the cost or rarity of the plants. It depends upon the temper of the person. One must first seek to love plants and nature, and then to cultivate that happy peace of mind which is satisfied with little. He will be happier if he has no rigid and arbitrary ideals, for gardens are coquettish, particularly with a novice. If plants grow and thrive, he should be happy; and if the plants which thrive chance not to be the ones which he planted, they are plants, nevertheless, and nature is satisfied with them. We are apt to covet the things which we cannot have; but we are happier when we love the things which grow because they must. A patch of lusty pigweeds, growing and crowding in luxuriant *abandon*, may be a better and more worthy object of affection than a bed of coleuses in which every spark of life and spirit and individuality has been sheared out and suppressed. The man who worries morning and night about the dandelions in the lawn will find great relief in loving the dandelions. . . . If I were to write a motto over the gate of a garden, I should choose the remark which Socrates made as he saw the luxuries in the market: 'How much there is in the world that I do not want!' . . . I expect, then, that every person who reads this book will make a garden, or will try to make one; but if only tares grow where roses are desired, I must remind the reader that at the outset I advised pigweeds. The book, therefore, will suit everybody, — the experienced gardener, because it will echo of what he already knows; and the novice, because it will apply as well to a garden of burdocks as of onions."

After this cheery introduction follows a host of practical suggestions regarding the preparation of soil, selection and use of implements, choice of sites, arrangement of borders, shrubbery, and paths, times of planting, qualities and relative desirability of different species of plants, protection of plants from insects and parasites, desirable forms of hothouses, etc. Especially noteworthy among the many sketchy but very telling illustrations are the "informal flower border" (drawn by Mr. F. Schuyler Mathews) and the contrasting pictures of "a house" and "a home." The whole work is a most forcible argument for informality in horticulture.

In connection with *Garden-Making* may be mentioned another

similar and still more recent manual by the same author, and called the *Pruning Book*. It is also one of Professor Bailey's "Garden-craft series," and, like its companion volumes, is full of well-told and practical information upon its subject, which, of course, primarily interests those engaged in the care of ornamental trees, shrubbery, orchards, or vineyards.

B. L. R.

Sulphur Bacteria. — Prof. Manabu Miyoshi gives an interesting preliminary account¹ of some of the organisms found in the hot sulphur springs of Japan. The first part of the paper consists mostly of field observations on a long scythe-shaped, peritrichiate, colorless, gelatinous bacterium which grows in masses in the hot springs of Yumoto and is covered with sulphur. The second part consists of an account of species of cophromatium and various other one-flagellate purple or rose-colored water organisms which frequently occur in patches in pools and swamps in the vicinity of the sulphur springs.

The scythe-shaped peritrichiate form is mostly $20 \times 1.4 \mu$ in size, but other much smaller curved rods occur. In places, also, species of *Beggiatoa* and *Thiothrix* may be found. The gelatinous masses grow only near the surface of the water in rapid-flowing hot streams charged with sulphide of hydrogen. They do not occur in quiet water, or in the depths, or in water cooler than 51° C. They are able to grow in very hot water, having been found in rapid streams, the temperature of which was 68° to 69.8° C. (154.4° to 157.6° F.). They have only been found in water containing sulphide of hydrogen, and this gas is believed to be necessary to their growth. Free access of oxygen is necessary to bring about the deposit of the sulphur crystals. The organisms will grow in closed conduits, but no macroscopically visible sulphur is deposited on them. When such masses were removed and put into open running water there was an immediate deposit of sulphur, and in an hour they became indistinguishable from the surrounding flocks. The sulphur deposit, which is very copious, and always, or at least usually, on the outside of the rods, covers even the thinnest threads, and appears to be in some way connected with specific properties of the gelatinous covering of the organisms. No deposits of sulphur at all comparable could be obtained by putting into the water fine linen threads covered with starch jelly, half coagulated albumen, concentrated gela-

¹ M. Miyoshi, Studien über Schwefelrasenbildung und die Schwefelbakterien der Thermen von Yumoto bei Nikko, *Journ. College Sci., Imp. Univ., Tōkyō*, vol. x, Pt. ii, pp. 143-173, 1897.